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THE JOURNAL OF PHILOSOPHY
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THE GROUP CONCEPT IN THE SERVICE OF PHILOSOPHY

THE best service that can be rendered to philosophy by any science is the creation of concepts which can be made tools for the general study of experience. To take over bodily into philosophy any scientific method is a policy whose mistake is attested by failures frequent and glorious enough; but for conceptual engines we have depended, and must depend, upon what the sciences are producing. Of these engines few have been devised of such scope and power as the concept 'group' which the mathematicians have been forging out for a hundred and fifty years.[1] This concept is an achievement of what we may call the morphology of mathematics; and by due refinement, discarding what is specifically mathematical, it can be set free for a career not less extensive than the entire morphology of experience. To effect this release, we have first of all to study the 'group' idea as it exists in mathematics, in an attempt to exhibit its logical essence, an attempt to which this paper is devoted. A succeeding paper will outline the field of its application.

The idea 'group' fills in extraordinary measure three typical and apparently divergent ambitions of the mathematical concept-builder: it is at once highly specialized, highly significant and highly simple. It is highly specialized, that is, limited; it is removed by a great depth of determination from the empty idea of a class of objects in general. We know, on general principles, that the amount of meaning carried by any idea, and extractable from it, bears some relation to its restrictedness; the properties necessary in order that a class of objects should qualify as a group are striking and—if we may speak of ideas thus statistically—rare. But a concept may be ideally restricted and yet empirically hospitable; it is so if what it excludes is *excluded by reality also.* If a concept thus adds to its specialization significance, it is what we mean in mathematics, and elsewhere, by a *powerful* concept. The group concept is powerful in this

[1] Bibliography in 'Transactions of American Mathematical Society,' April, 1906; 'Note on Definitions of Abstract Groups, etc.,' by E. V. Huntington.

sense: it concentrates a large range of the actual business of mathematics into itself; and demonstrations made upon it have that quality which is called in the weird language of mathematical esthetics, 'elegance.' But thirdly, it is highly simple; and here we come upon a notion much used and little understood—perhaps because it itself is simple—an ideal which expresses itself usually in the demand that the concept shall be definable in few and obvious terms. In brief, the mathematician, in the union of these antagonistic motives, is trying to get 'near to nature'; and the degree to which he has succeeded sufficiently explains the importance of his product to the morphology of experience. Let me state at once, in rough, the salient character of a group, as a basis from which to reach by stages a precise definition.

A group is a class of objects so related to each other that a rule may be stated whereby, when any two members of the class are given, a third member is pointed out, or determined. Whole numbers, for example, are so related to each other that, by a rule of addition, any two of them determine a third. If the class be rational numbers, the rule of multiplication has the required property. For forces, angles, etc., similar rules may be alleged; the constitution of these worlds of objects permits any two of the given class thus to govern, or infallibly indicate, a third.

From the logical point of view, this definition has a very striking peculiarity. A class of objects is usually defined by naming the characters of the typical member of the class; the relations which members of the class bear to each other are not mentioned. The group definition, on the contrary, says nothing whatever about the character of the individual members of the group, and is concerned solely with the relations among them. It is the business of ordinary class definition to concentrate upon, and confine to, the individual all the distinguishing criteria of a class, and to consider peculiar relationships as resultant from this character. The group definition abandons this line of attack upon the object of knowledge: it begins with the relation.

Now the 'rule' which plays so conspicuous a part in the definition is nothing else than this relation transformed and fluent—thought of as *active*. The characteristic relationship of group members is triadic, and the rule exhibits this relationship as clothing itself with its full complement of terms; two terms of a triad being filled with two given members of the class, the relation, under the guise of a process, is conceived to discover its missing term. There is no logical necessity, so far as definition is concerned, for thus

mobilizing the group relation and turning it into a rule; this is a mere accident of the mathematical exploitation of the group structure for purposes of calculation. The essential point is, that if the whole numbers, for instance, constitute a group, it is not on their own merits, as members of the class whole numbers, but by virtue primarily of a certain triadic relation into which the various whole numbers can be thrown: that, namely, of *a, b* and *c,* when *a* plus *b* is said to *equal c.*

The fact that the brunt of definition of a group falls upon the group relation or rule does not mean that the individual is lost from sight. Just as the description of the individual, in ordinary class definition, limits the variety of possible relationships within the class; so the specification of relationship limits the range of the type of individual that can stand therein. It is true that of all conceivable classes of objects having a plurality of members, there is perhaps none for which some ingenious rule might not be devised to comply with the rough definition we have given. For so disorderly a class as, let us say, all the ships on the Atlantic, there might conceivably be a convention to the effect that any two ships shall indicate that other ship whose latitude at any time is most nearly their mean latitude. But in proportion as the nature of the rule is brought to precise expression we shall find the variety of individual types that can support that rule rapidly lessened. By excluding the artificial, ingenious and conventional types of rule the mathematician excludes at the same time the more contingent, accidental and limited sorts of classes; there is a genuine *rapprochement* between rule and type of object, until the rule becomes, so to speak, the *natural law* of the group—as addition is, in a genetic sense, the natural law of whole numbers. It is of extreme interest to observe how the mathematician has made precise the statement of the properties of the kind of rule thus vaguely described.

Let us first require of the rule, simply, that it point out always *one and only one* third member, any two being given. The disorderly class above suggested is immediately excluded, and with it a vast army. For whatever the character by which the rule identifies the required object, it must be a character which one of the class *must* have, and no two of the class *can* have. Very few classes can boast, on the one hand, such intrinsic individuation and, on the other, such complete representation of all points in that individual order which the rule might possibly call for. Most classes of objects, in their principle of individuation, are parasitic, making use of the already individual points of some field, such as space, to identify their members: none of these can yield a group rule.

Consider, secondly, an important series of classes—the species and genera of organisms in their genetic relations. Imagine the species buffalo, ideally complete in infinite past time. The rule that any two buffaloes indicate their nearest common male ancestor complies with the requirements so far made. The ancestral series is necessarily without gap, and the individuation is intrinsic to the species. But from the point of view of the group, such a rule has a serious defect: there is a large segment of the class which the rule can never reach in its determinations; the female ancestors are never identified. It is required of the group rule that it be possible to determine by its use *all* members of the class; and this requires of the class that its intrinsic order of individuation involve all its members homogeneously. Let us now state, in its own brief terms, a technical definition of a group. Let there be a well-defined[2] class, or assemblage, of objects, K. Then K will be a group with reference to any statable rule which complies with the following requirements:

I. Given any two members, or elements, a and b, of K, there is determined by the rule a unique object, x, which is also an element of K.

II. Every element of K is determined by the rule from two other objects, either one of which being chosen at will from K, the other is thereby fixed, and is an element of K.[3]

III. Any three elements of the assemblage being given, if the first is paired with the second according to the rule, and their result with the third, the object thus determined is the same object as is found by pairing the second with the third, and then the first with their result. In other words, the law of association holds.[4]

[2] Defined, that is, by a condition which every object in the universe either does or does not satisfy, so that there is no ambiguous or doubtful margin of objects.

[3] There is no whole number, for example, which is not a sum of two others, properly chosen; any (other) whole number may be taken as one of a pair of addends to make that sum, in which case the second member of the pair is also a whole number, uniquely fixed.

[4] In terms of the relationship R, these postulates become:

I. Given members a and b, there is a unique object, x, such that $R(a, b, x)$; and x is a member of K.

II. Given members, a and b, there is a unique object, y, such that $R(a, y, b)$; and a unique object, z, such that $R(z, a, b)$; and y and z are members of K.

These two can obviously be put into one, to the effect that:

Given members, a and b, there are unique objects, x, y, z, such that $R(a, b, x)$, $R(a, y, b)$, $R(z, a, b)$; and x, y and z are members of K.

III. If we have $R((a, b), c, v)$ and also $R(a, (b, c), u)$, then v and u are identical (the convention (a, b) meaning 'the element determined by a and b').

In this definition, postulates I. and II. clearly supplement one another. Distinguishing in the triad two functions, that of the determining pair and that of the determined element, postulate I. demands that for every pair there be a determined element; while postulate II. demands that for every element there be a determining pair, or series of determining pairs. Postulates I. and II. do not of themselves, however, instruct us which element in any given triad is to be regarded as the determined element, and which pair the determining pair. Postulate II. intimates that no matter which of the three couples in any triad are given, the remaining element is determined; so that wherever it is possible to state one rule, it is possible to state three rules, which equally comply with the conditions. If a and b determine x, then a and x will determine b by another rule, and b and x will determine a by still another. If whole numbers are a group under addition, they will also be a group under substraction,[5] so far as these two postulates are concerned. Postulates I. and II. are, in fact, equivalent to the following summary definition: A group is an assemblage whose elements sustain triadic relationships of the form R; R being such that two elements are *necessary*, and any two are *sufficient*, in any two terms of the triad, to fix uniquely the third term of the triad.

But the three rules which govern any triad are, in an important sense, phases of one rule. Addition and subtraction, for instance, belong to each other as addition and multiplication do not. And

The language of R has the advantages and disadvantages of symmetry. It must not be forgotten that the original trend of determination is from a and b to x, in $R(a, b, x)$, and not to y and z in $R(a, y, b)$ and $R(z, a, b)$; only the first defines the specific rule. There is no postulate to the effect that y and z are discoverable; and if they are so discoverable, the rules by which they are found are genetically 'inverse' to the rule of $R(a, b, x)$. The language of R further obscures certain important ordinal distinctions between postulates I. and II.; distinctions of the sort brought out in the paper of E. V. Huntington (superseded by his own later work, but in this respect not improved on) in *Bulletin of the American Mathematical Society*, 2d Series, April, 1902. It is II. that gives the concept its mathematical stamp; postulate I. is presupposed in II. and is on a different logical plane. The relation between them might be expressed by calling II. the postulate of determined determinants. The language of R is appropriate for expressing results, and for exhibiting the philosophical character of the finished concept, but not for showing the genetic meaning of the group.

[5] The circumstance that the two kinds of subtraction are identical is a concomitant of the circumstance that for addition the order of the two addends is indifferent—if $R(a, b, x)$, then also $R(b, a, x)$; the commutative law holds; the group is a so-called Abelian group. In general, the functions of a and b in the triad are different, so that their order can not be inverted without altering the object determined, in which case the three rules are all different.

there are reasons for regarding *one* of the three rules of a triad as the group rule, par excellence, from which the other two are derivative; one as direct, the others as 'inverse.' These reasons, whatever they may be, are embodied in the third postulate, which addition, multiplication, etc., satisfy, whereas subtraction and division do not.

This third postulate is something of a mystery. It offers no illuminating insight into its essential motives. It seems mechanical, extraneous, and a disturbance to the neat internal harmony of the others. It has often appealed to the mathematician as a conclusion, or theorem, rather than as a first premise. But if it is deducible from something more primary, that something has not yet been formulated. I surmise that this postulate of association *is* a deduction; but that its premises lie in a region outside mathematics proper, so that the mathematician will always have to content himself with the cumbrous law as a first principle. In what follows I shall make an attempt to find its sources. I turn to an analysis of the concept now definitely before us.[6]

The business of mathematics is to make identity do work. The difference between an equation which has a root and an identical equation, so-called, which is analytic, barren and stationary, illustrates the motive in question. If we could discover within these three postulates the essential unity of the group concept, and at the same time the secret of its power, we should find it in some such working identity, some asserted or demanded agreement between things conceptually independent. There is, in fact, a fundamental duality in the group concept, a duality which each one of the postulates in its own way partially expounds and synthesizes.

We have said that the group definition addresses itself to the relation between objects rather than to the individual object. The ideal of this relational type of definition is to ignore the individual, and to describe its class as 'the totality of all possible terms of the

[6] Thesis: The primordial data of mathematics must always be pragmatically defined, in the sense that they express *particular results* of the character of the concept, and not the character itself. They follow precisely the form of the old Latin *ut* clauses; the object to be defined is 'of such a nature that as a result' m equals n. Hence it is that definition takes the form of a set of postulates. And hence it is that no set of postulates can be proven 'sufficient' for an assemblage of real objects (*e. g.*, for absolute continuous magnitude as an object of experience), though sufficient connection may very well be made with a type of theory *applicable* to continua, when that theory already exists as a body of fundamental theorems. Weber's distinction here is fundamental. See 'Lehrbuch der Algebra,' II., S. 6, 'Die Eigenschaften der Gruppen. u. s. w.'

relation *R.*' But the group definition does not attain this ideal detachment. There is no such thing, for example, as the totality of all possible terms that can stand in additive relations. Whole numbers, real numbers, numbers and continua of very various kinds, alike constitute groups under addition. There is no unmistakable implication and marriage of rule and class.[7] Hence it is that two data are necessary to designate any actual group. A group is not fully described as 'the group of multiplications,' but as 'the group of multiplications *among* rational numbers,' or, as 'the group of rational numbers *with reference to* multiplication.' A group is, in reality, a double genus: it undertakes to mean at the same moment objects of two distinct orders,—things as well as relations, a class of particulars as well as a kind of class. The working power of our concept is measured by the degree of independence between these two sets of objects which it brings together, and by the degree of unity which it effects. The fundamental deed of the group concept may be thus stated: It defines a correspondence between the relatively independent domains of a dyadic class relation and a triadic relation of the form *R*, above described.

The most obvious phase of the correspondence in question is *coincidence in range.* In so far as connotation is considered to determine range, or denotation, the ordinary class relation is virtually made an active rule—is mobilized in a manner analogous to the flux of the group relation. But in contrast with the group process, it reaches wholeness at a bound. It may indeed be conceived to operate serially, in a chain of *recognitions*—in which case it may develop in the form of a 'Kette,' as in the number series; but this chain is, at the statement of the definition, ideally complete; the membership and outline of the class are fixed. If we presuppose that the class rule has completed its work, and the assemblage *K* is completely made up; and if we then allow the group rule in its triple character to run at large within *K*, using every possible pair of elements, in every possible way, to determine new terms: we already know that in the totality of these new terms (1) nothing is added to the assemblage, and (2) nothing of the assemblage is left out.[8] The domain

[7] There is, however, a peculiar and obvious appropriateness between certain rules and certain classes. Addition is more at home among whole numbers than anywhere else. The group concept will not be finally clear until the distinction is made between the original and the derived classes for any rule, and the perfect mutuality of rule and object has been established, for these originals.

[8] By postulates I. and II. the active group relation, conceived as a triple rule determines always class members, and nothing but class members. Thus, a process like multiplication-division, which working at large among whole numbers deposits its fruit sometimes within the class and sometimes without,

of the group rule thus obviously coincides with the domain of the class rule. But the significance of any agreement is in proportion to the degree of independence between the agreeing processes; and the group rule has a greater independence of K than our present presupposition shows. Complete independence is, of course, impossible; for the group process does not work in the void, as the class process does—it requires a datum of two objects in order to make a beginning; but for certain fundamental groups a *base* of two elements can be so chosen that the group process, by adding its successive results to the base, will run through the whole assemblage, determining every member without omission. And for any group whatever there is a *class* of objects, included within the group, from which as a base the group process will thus generate, or rather, regenerate, the whole assemblage. To measure the full worth of the demanded coincidence of range of these two processes we should have to determine this base. For our purpose it will be enough if we locate it within the group by establishing one necessary element thereof.

There appears to be nothing in the definition of the group process itself which would enable us to single out any region of an assemblage in preference to another as a base. The group idea is emancipated from the peculiarities of the objects both by its primary interest in their relations and by its ideal generality. The group process is impartial in its concern with the several elements of the assemblage; the distribution of the triads into which the assemblage crystallizes under its group rule is perfectly homogeneous. Considering the totality of these triads, it appears from postulates I. and II. that every element is found *with equal frequency* in each of the three positions in the triad, determining and determined; and that all elements occur *with the same frequency*. According to this ideal impartiality, in thinking of the pairs into which any given element can enter, the pair *with itself* is not omitted. For every element m there must be elements x, y, z, such that $R(m, m, x)$, $R(m, y, m)$, $R(z, m, m)$.

But in the moment of attaining this perfection of indifference to the elements the generality of the process seems to break off its own point. By postulate III. it can be shown that y and z in $R(m, y, m)$ and $R(z, m, m)$ are always identical. Also that in $R(m, y, m)$, $R(n, y', n)$, $R(p, y'', p)$, etc., throughout the assemblage, y, y', y'', etc., are all identical, and so also identical with the corresponding z, z', z''. This identical element, which thus con-

can not be a group rule for whole numbers. By Postulate II., every member of the class lies within the sphere of determination.

stantly reappears in all cases of self-determination, may well receive a special symbol, i. For it, $R(i, i, i)$ holds; and it is the only element that can occupy all three terms of R at once. Such an element is the *zero* of addition, and the *unity* of multiplication. All the exceptionalness that was set aside by allowing elements to pair with themselves, is concentrated upon this salient member. The significance of the postulate of association we may presume is bound up with its ability to precipitate the element i from the homogeneous body of the assemblage. We have now to come into closer quarters with that postulate.

It is the work of the group process to transmute determinations of two elements into determinations of one. This requires that the determining elements be themselves determinate. Now there are two ways in which a pair of objects may be determinate: either with reference to one another; or, in relative independence of one another, with reference to a common third. If every pair of elements of an assemblage were determinate in the second manner, and if the common third of all pairs were the same object, we should have reason to characterize their determinations as *absolute,* in contrast with the merely relative determinations of the former type—a kind of absolute which, as usual, means simply, relative to a third. From the point of view of the class relation merely, the adoption of any point of reference for 'absolute' values is purely *arbitrary.* The points of a line are in order, the relations of positions and figures in space and of discrete objects submit to mathematical reasoning, without the assumption of any *origin.* But

(α) No *associative* process can be defined without reference of the determining and determined objects to an origin (taking this term in as wide a sense as is necessary to cover the variety of fundamental groups).

(β) No associative process can be defined wherein the relation of the determining objects to each other is a constituent function.[9] On the other hand,

(γ) That any rule be associative, it is sufficient that in the determinations of x, in $R(a, b, x)$, the determinations of a and b, with reference to some origin of absolute values, shall exist unaltered.[10]

[9] No rules, that is, can be associative in which x, in $R(a, b, x)$, is a function of $b:a$. K being all numbers, the rules that $x = b - a$; $x - b = b - a$; $x/b = b/a$; $x = (b - a)\ (b + a)$; etc.; or, K being the points in space, the rule that x be the middle point between b and a, etc.—are for this reason not associative.

[10] As most obviously in addition of numbers; also in addition of displacements referred to Cartesian coordinates, etc. 'Unaltered' means to exclude those obscurations of the individualities of a and b in x which arise (1) from

It appears, then, that what the third postulate essentially demands of the primary group rule is: That in the element which results from combining any two elements, the individuating marks of these two elements shall neither be cancelled by an eliminative comparison with each other nor obscured by intrusion of alien parameters; that a and b shall enter into x only as objects defined in independence of each other by reference to an arbitrary origin of absolute values, which we may represent by the symbol o.

Herein is implied that as members of the group, the elements have no relations to each other which are not themselves elements. Points, related by distances, can not constitute a group; but distances, related by distances, may do so. Now any element k may be the medium of relation for many pairs, $R(n, k, p)$, $R(p, k, r)$, $R(r, k, t)$, etc., but in the pair with itself, $R(i, k, k)$, which is, in a special sense, a declaration of its own identity, or absolute value, it is clear that the absolute value of i is no other than o, which thus appears a member of the assemblage.[11]

It may now readily be shown that the other elements are disposed symmetrically about o, in such wise that for every element a there is an element a', such that $R(a, a', o)$ and also $R(a', a, o)$. The center of symmetry in the assemblage thus corresponds to the center of self-determinations in the group. The element i is a sort of pivot upon which turns the correspondence of the two domains we

relativity, and (2) from intrusion of alien variables or alien rules. Thus, $x=(a+b+2)$, or $x=2ab$, may be associative; but $x=2(a+b)$, and $x=ab+2$ can not be; neither, $x=a+b+b$, nor $x=ab^2$.

I am not yet able to state a necessary and sufficient condition for an associative rule in mathematical form. Such formulation might be attempted on the following lines. Consider $R((a, b), c, v)$ and $R(a, (b, c), u)$. To obtain v, in the first complex triad, a and b have been subjected twice to the group operation—which let us call f—while c has been subjected to it but once: a fact which might be symbolized by $v=ff(a), ff(b), f(c)$. In the second complex triad, $u=f(a), ff(b), ff(c)$. The condition that u shall be always identical to v is that ff shall be neither more nor less than f, in regard to the specifications by which a and b are individuated.

[11] As such member, it has, like k, a triad which in a special sense defines it, $R(o, o, o)$; and enters into an indefinite number of triads as a merely relative 'absolute'—$R(m, o, m)$, $R(n, o, n)$, etc. Thus, with the establishment of the one arbitrary origin, are established as many secondary origins as there are elements; potential origins, if you will, which by their varying departures from the primary origin are analogous to the 'potential' points in a field of force. This transferableness of origin has sometimes been taken as the essential meaning of the associative law, addition, for instance, being explained as follows: in $R(a, b, x)$, b is counted from the transferred origin defined in $R(a, o, a)$. Such explanations are accurate but derivative, inasmuch as the origin o is logically distinct from the element o, for which the symbol i is proper.

are comparing. It is the navel of the group; and the function of the third postulate is to insist upon this connection as the group process approximates absolute freedom and generality, and the group relation approximates perfect independence of the individual,—to insist upon this connection with an arbitrary origin, without which the required *base* for determining the group domain through the group process alone can not be defined.

We describe a group, then, in sum, as the domain of a threefold process, in which two terms of a triad constitute data necessary and sufficient to determine the third; the domain being coincident with the domain of a given dyadic relation defining an assemblage of objects.

The writer is conscious that these formulations are descriptive rather than mathematical. It has been his aim to express the spirit and *Motivirung* of the group concept, within the limits of accuracy, rather than to expound its machinery; and the resulting analysis, which perforce leaves many questions unanswered, may be sufficient to show in what direction we must look for the epistemological service of the group concept.

WILLIAM ERNEST HOCKING.

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LINGUISTIC STANDARDS

THE teaching of English in our schools and colleges has concerned itself very little with the theory of linguistic usage, the disadvantages of which omission are apparent in the light of recent psychological advances.

That a historical linguistic standard is necessary is everywhere admitted; use is the law of language. But to the inevitable query 'whose use?' the exponents of the present methods of teaching English give a far from satisfactory reply, not the more so for its practical unanimity. The present historical standard is decidedly conservative in character, exercising the greatest vigilance against all encroachment upon the recognized linguistic material. The author of the usual 'Principles of Rhetoric' resists the technical terminology with the same vigor with which he opposes the dialect of the submerged tenth. But the former arises out of growing needs of the language, while the latter is composed of figurative terms for which there are already proper equivalents. There are many cases in which the condemned technical avoids ambiguities in the sanctioned popular parlance. Under the historical standard in its present form

illogical and confusing usages are admitted and preserved. The shall-will construction could never maintain itself under a standard paying any heed to linguistic psychology.

This standard, as enunciated by the intellectual descendants of Schottelius, Gottsched and Adelung, provides that the arbiter of linguistic usage shall be the usage of authors of established literary reputation. The standard is, therefore, a purely literary one. What established reputation means is generally not defined, and it must be admitted that its criteria are usually subjective enough; but it is the first axiom of literary criticism that no reputation for literary excellence can be established until at least a generation after the death of its possessor. Such standards as this can not, therefore, well be younger than twenty-five years, and there has been no time when the language of twenty-five years ago was less fitted for later employment than the present. Good use should by this standard keep by so much in the rear of the actual needs of the language, and that it does so is shown by the frequent necessity of the exercise of the conservatism characteristic of the exponents of this standard. From this interpretation of the historical standard a reactionary attitude is logically inseparable.

Whatever may be the, as yet, very imperfectly defined criteria of the right to become an arbiter of linguistic usage, the exercise of correct linguistic usage can not itself be one of them. Nothing can be simultaneously a cause and effect of the same thing. A literary product, being good use because it is great, can not be great because it is good use. This forces all advocates of historical standards into the position that every linguistic monument possessing certain requisite criteria of greatness is *ipso facto* correct linguistic usage. This position is defensible provided these criteria are properly selected. It is wholly indefensible through such criteria as those exhibited by the group from which the models of the present historical standard are selected.

The most universal and the most essential of the characteristics of recognized literary greatness is an appeal to subjectivities,—to the emotions. The influence upon language of the scholar, scientist and philosopher is small indeed compared to that of the essayist, novelist or poet. Is not the influence upon the present standard of linguistic usage of an Addison, a Scott or a Wordsworth immeasurable compared to that of a Basil Gildersleeve, a Simon Newcomb or a William James? Yet the former employers of language, whose appeal is primarily emotional, have surely far less claim to the arbitrament of linguistic usage than the latter, who employ language in its sole function—the objective—which is capable of regulation. The value

of a scholastic or scientific work may from this very fact be more rapidly, not to say more accurately, estimated, and thus the first objection to the present standard would also be satisfied.

Models of linguistic usage, as determinative of that body of linguistic elements to be considered good use, are, therefore, rather to be sought among works whose criteria of value are more objective in character, for such works are in closer touch with the actual needs of the language.

However elaborately accounted for, the statements of the interrelationships of this material as given in the usual 'Principles of Rhetoric' are dependent upon a single factor—the author's introspection. The manner in which these principles are imparted to and accepted by the college and even the university student of English constitutes one of the most melancholy pages in the history of the phenomena of suggestion. Especially is this true when it is reflected that there is hardly one of these topics upon which we are asked to accept as final their subjective judgments that is not capable of objective investigation. The physical sciences were rescued from this sort of advancement by Galileo at the Leaning Tower; elsewhere the emancipation has only just begun, and especially is this true of the science of language.

Objective determinations regarding the choice of words are best made through the medium of the omitted-word test. In its usual form the subject supplies occasional blanks in otherwise connected composition; this constitutes one of the most practicable measures of general intelligence that we have. As an objective determination of the 'right word' the subject should arrange a group of synonyms in order of their supposed effectiveness in the given context. Relative values may then be calculated by relative position.

Upon this principle the writer has applied relative position in determining the relative force of synonymous groups. These groups, 11 in number, consisting, in seven cases of 5, in two of 3, in one of 7, and in one of 9 synonyms each, were presented to a class of 32 English graduate students in Columbia University, out of whom 19 returned answers, one confessing inability to make the arrangements. The series were presented in random order, and the subjects requested to arrange them in order of force. No definition of force was given, as it was desired also to determine the amount of unanimity in its conception. The objection that this group of subjects might be influenced by previously suggested definitions of force must be answered with the fact that the arrangements did not consistently follow any of the usually not overclear definitions that it has been attempted to lay down. The judgments are as follows:

Order	Positions	P. E. (18 Judgments)	Order	Positions	P. E. (18 Judgments)
Glorious,	1.7	.15	Eternal,	1.3	.1
Illustrious,	2.7	.18	Immortal,	2.3	.1
Exalted,	3.1	.2	Undying,	3.3	.16
Noble,	3.2	.29	Imperishable,	3.8	.17
Renowned,	4.3	.14	Ever-living,	4.1	.2
Radiant,	1.9	.14	Fleeting,	1.9	.2
Resplendent,	2.4	.22	Momentary,	3.1	.22
Brilliant,	2.6	.2	Evanescent,	3.3	.31
Lustrous,	3.8	.14	Ephemeral,	3.4	.26
Shining,	4.3	.2	Transient,	3.4	.18
Dark,	1.4	.12	Desolation,	1.8	.19
Obscure,	3.1	.22	Ruin,	2.5	.23
Murky,	3.3	.24	Devastation,	3.1	.18
Dim,	3.4	.24	Waste,	3.5	.26
Dusky,	3.8	.14	Havoc,	4.3	.18
Calm,	2.3	.18	Ocean,	1.6	.11
Peace,	2.5	.27	Sea,	1.8	.12
Silence,	2.9	.24	Waters,	2.6	.13
Stillness,	3.3	.22			
Quiet,	4	.16	Infinite,	1.3	.09
			Boundless,	1.8	.1
			Unlimited,	2.9	.04
Devil,	1.8	.25	Fearless,	2.7	.29
Satan,	2.4	.17	Heroic,	2.8	.31
Lucifer,	4.5	.35	Brave,	3.4	.33
Prince of Darkness,	4.8	.33	Courageous,	3.6	.18
Arch-enemy,	5.5	.29	Valiant,	3.7	.27
Belial,	5.6	.27	Gallant,	5.7	.27
Father of Lies,	6.3	.41	Doughty,	6.1	.17
Apollyon,	6.8	.37			
Old Serpent,	7.2	.33			

P.E. = .205 A.D.

The judgments have, on the whole, a greater validity than the writer had anticipated. Out of the 28 judgments in the five-word series, in 10 cases a preceding word plus its probable error occupies a lower position than the immediately succeeding minus its probable error. In the majority of cases the positions may be accepted with a very fair degree of certainty. The probable error does not tend to increase materially as the lower positions are reached, save in the two last series, where the complete supply of synonyms was given. Elsewhere the weakest word has frequently a smaller probable error than any in the series, although it was intended to select only the stronger of a group of synonyms for judgment.

Various interesting groupings occur in the judgments, of which only a few instances may be cited here. Thus, in the *glorious* series there are two distinct species of grades, one giving *glorious* first place, the other *noble*. But those who give *noble* first place almost always give *glorious* second, while those giving *glorious* first place give *noble* fourth or fifth. Hence the low position and large probable error of *noble* in the result, which is really a mixture of species. In like manner those who grade *radiant* high tend to give *resplendent* a higher grade than those who grade *brilliant* high. There is a small number of cases in which *resplendent* is given first place, and in these judgments *lustrous* receives a disproportionately high grade. Perhaps the most interesting single series is the *fearless-heroic*. There are here to be recognized groups grading as first either *heroic*, or *fearless*, or *brave*. *Brave* gets its lowest grades from the *heroic* group, and *heroic* gets its lowest grades from the *brave* group. The *fearless* group gives *heroic* and *brave* almost equal grades. But there is another equally distinct mixture of species apparently independent of the word given first place. About three fifths of the subjects grade *valiant* either second or third, the remainder grade it either fifth or sixth. The group giving *valiant* a low grade tends to give *fearless* a higher grade than *heroic*, and the group giving *valiant* a high grade gives *heroic* a higher grade than *fearless*. These few facts may give an idea of the intricacy of the whole problem.

No general deductions are to be drawn from these results, and only by a very large series of observations could it be determined whether the experimental method justifies the formulation of any general principles, or whether their data are merely to be accepted as facts, not truths. But in proportion as the facts are investigated, will the decrees of introspection lose their *ex cathedra* significance.

COLUMBIA UNIVERSITY. FREDERIC LYMAN WELLS.

SNAP SHOT OF AN ASSOCIATION SERIES

THE current stock of stories illustrating association series is getting a little shop-worn, and it behooves psychologists to look over a few samples preparatory to getting in some fresh goods. The following sample is an honest piece of photographing, and although it lacks the color and warmth and fine shades of an actual experience (except to the persons who had the experience), it is nevertheless as true to life as such snap shots can be. Perhaps this account may stimulate some psychologist to record and recount more of the 'ordi-

nary' experiences of every-day life. The story follows—at this writing it is exactly ten minutes old!

I

Mrs. and Mr. X. are sitting by the fire on a cold winter's night. It is about an hour after supper and the three strenuous youngsters have been bundled off to bed. The seven-months-old baby still holds the fort, but is making no disturbance other than trying her involuntary vocabulary with evident enjoyment. Mr. X. has been smoking, but has just discovered that the pipe he has been using ought by rights to be retired—speedily. This belief of his is shared by the surviving members of the family. He facetiously remarks on the muscularity of his aged instrument of solace. Whereupon Mrs. X. remarks mechanically (humoring a fool according to his folly), "Ancient of days." She is a reverent churchwoman and quite accustomed to the Bible phrase and the hymn beginning with these words. Nor does she reflect upon the seeming irreverence of using the words in such a connection. For forthwith she forgets all about the offending pipe and begins to sing the noble hymn 'Ancient of Days,' following Jeffery's familiar tune of the same name. Now this reaction on her part was to be expected, inasmuch as she is a member of the choir and her husband a 'sort' of member. So the ruminative song-attitude is 'on.' By the time the hymn is ended the baby furnishes an apparent diversion. She 'says' something that sounds like 'wicker.' Now this word fires off a family joke; for the three-year-old sister of the baby is in the habit of characterizing her infant sister's reprehensible habit of 'licking' the sheet as the doings of a 'wicker' (licker). Straightway Mrs. X. takes up her parable, following 'wicker' as a cue, and proceeds to sing—for the song is still the thing—'Sweet Dreamland Faces'! Not, as one might suppose, for the benevolent purpose of suggesting slumber to the 'wicker,' but because the words 'the *wicked* cease from troubling' occur in the last stanza of the aforesaid song. Her husband dreamily joins in and at the end somewhat jauntily chants as final recitative the barbarous syllables, 'tum-tum-tum.' At this juncture Mr. X. should have allowed his companion to have the next inning, but his mood of rhythm lures him on, and the frog's supposed advice to the befuddled carouser comes to mind: the inebriate is about to cross a swampy place and he thinks he hears the frogs say, "Better-go-round." Whereupon Mr. X.'s voice repeats his mind's remark and he says lazily, "Better-go-round." Of course Mrs. X.'s mind is not going to be deprived of its due, so she speaks out the mocking remarks of

another group of frogs, who tempt the hero of the story by their alluring suggestion of 'jug-o'-rum.' This cadence recalls to Mr. X.'s thought the guinea-hen's cry which he had heard about two hours before—not the commonplace 'pot-rack' of popular report, but a sinister 'Jugg-er-naut'! And why this heretical word? Because about a year before, while Mrs. X. lay near death's door on account of a very serious injury seemingly due to a trivial cause, Mr. X. heard the hysterical bird of Africa wail out the words of his own fateful mood. Ever since he has heard no other sound from the bird but— 'Juggernaut.' And finally the little drama of association comes to a close, for Mrs. X. begins to imitate, for the baby's benefit, the soprano chuckle of the domestic turkey-hen! Whereupon Mr. X.'s mind is 'sicklied o'er with the pale cast of thought,' and he invites Mrs. X. to a ghostly study of experiences just expired.

II

The 'laws of association' are still supposed to be one of the most respectable assets of psychology, in spite of many rather harsh criticisms of 'association.' Indeed, most students of mental facts would agree that association is not the mechanical and atomistic process it is so often represented to be. Inasmuch as the little account we have just given is a good illustration of association in its most mechanical form, it may be interesting to comment on some aspects of suggestion as revealed by this case.

1. We may note that our true story has nothing to do with logical thinking and that it is free from emotional values. Even 'Juggernaut' appears free from its emotional fine linen, owing its appearance to its recency, to its mechanical resemblance to 'juggerrum,' and to the fact that it is a piece of experience 'shared' by the two parties of our story. But it is evident that the series would never have occurred if the 'laws' of similarity and contiguity were the only modes of association. For the very reason of being of the series is due to social *en rapport* and responsiveness. We may note further that the rhythm-attitude is present all through the give-and-take of a rather listless mentality.

2. One is strongly tempted to call our story a case of 'association by community.' There is community of time, place and circumstance; community of interests and experiences; conscious *en rapport* and responsiveness. Nowhere does the action go beyond the experience common, and *known* to be common, to both actors. May we not say that here we have a case of the psychological process underlying Adam Smith's 'sympathy' and Professor Giddings's 'conscious-

ness of kind'? Assuredly the series is not explained by the trivial congruity of such words as 'wicker' and 'wicked,' 'Juggernaut' and juggerrum,' and of such rhythmic resemblances as 'tum-tum-tum' and 'better-go-round.' True, these resemblances 'fire off' the various episodes; and continuity (contiguity) in experience determines each party's associative reactions; but both modes of association are cut across by the mutuality and 'give-and-take' of association by reciprocity or community. Each one's experience-continuity is checked and determined by features common-to-both. Would it, then, be 'mythological' to say that *social* similarity-and-contiguity is manifested by 'association by community'? May it not turn out that a careful study of all real and concrete experiences of association will show three phases of associative process—(1) continuity (contiguity), (2) congruity (similarity), (3) community (*en rapport*)? After all, in a sense it may be said that real association *is* fundamentally social and that 'psychological' association is but a pale abstract from the richness of social experience.

3. An 'ethological' study of our story would show practical interests and character-tendencies as the real powers behind the throne. For instance, we may note: singing for the children, the baby's doings, the other children, the wife's sickness, imitating animal cries to amuse the children. All these tendencies belong to the same general group, and therefore cooperate to keep agoing any attitude that is consonant with them. If the modes of association determine the *form* of the series, and the prevailing attitude its general contents, then it would seem that the instinctive tendencies or impulses determine its *special* contents. In our ordinary studies of association our interest is largely absorbed by the forms of connection, and the real motive-powers that decide *what* items shall be associated escape our attention.

4. Our case presents us with a typical instance of ordinary unhurried psychical action. We should, therefore, expect to find the essential 'mental elements' or psychical aspects pretty well marked.

Now this is exactly what we do find. Conspicuous are (1) sensational imagery, the 'substantive elements'; (2) relational elements, relations of continuity, community and congruity, corresponding to the three modes of association. The various forms of 'feeling' emphasize and evaluate the items of our experience, but here (3) instinctive *impulses* or tendencies may be said to share with sensations and relations the distinction of being the mind-stuff that *conduct* is made of. Indeed, feeling (pleasure-pain, emotions and moods) seems to be both sensational *and* impulsive, with relational elements in the background. And intellect and will are evidently complex functions.

Possibly a large and varied collection of the commonplace associations of daily life would afford fine material for that study of attitude and conduct which the ethology of the future must more and more emphasize in psychological investigation.

UNIVERSITY OF MISSISSIPPI. THOMAS P. BAILEY.

REVIEWS AND ABSTRACTS OF LITERATURE

Poetry and the Individual.[1] HARTLEY BURR ALEXANDER. New York and London: G. P. Putnam's Sons. 1906. Pp. x + 240.

It is by no means easy to classify this book as respects its aim and purport, for its unity is due to its ideas and sentiments rather than its problem. It is designed to be the application of a philosophy (which remains for the most part in the background) to the 'analysis and interpretation of the experience of beauty' (p. 4). The experience of beauty the author believes to be most significantly represented by poetry, because in poetry 'the idealizing motive is most manifest' and because among the arts it best unites 'the impulsive charm of wild nature with the sensitive exclusiveness of artistic disposition' (pp. vii, 5). The term 'individual' appears in the title because to the author's mind all things are good in so far as assimilated to human personality, and because, more particularly, in the development of the sense of beauty, as elsewhere in the world's growth, is to be found an intensifying evolution of individualities (pp. 5 and 213). I shall here briefly resume the author's development of his theme.

The impulse to poetry is the instinct to express *mood.* Mood is 'a kind of insight' significant of 'what is deep-lying in character,' of what the author terms 'an impersonal personality,' an 'apotheosized, ideal self.' Ethical inspiration expresses itself in the ballad and epic, from which poetry diverges into the drama, which emphasizes the idea, and the lyric, which 'aims to win an emotional rather than an intellectual consistency,' and which through the very absence of explicit and literal articulation expresses the mood more adequately (p. 16). Such expression of mood is to be regarded as an end in itself, and is thus to be distinguished from scientific truth, which 'exists only for its utility' (p. 13).

In the development of poetry the author marks three stages: the *objective* and *dramatic;* the *subjective,* or *a priori,* based on the poet's conviction of the validity of his own personality; and the *introspective.* The last of these stages is best represented by 'modern lyricism,' which bespeaks the present-day social democracy with its elevation of the individual to the place of supreme importance. Contemporary tendencies—both ideals and misgivings—are to be understood as due to the incomplete adjustment of this new order, in which a hesitant self-consciousness

[1] An analysis of the imaginative life in relation to the creative spirit in man and nature.

has already replaced the earlier natural and communal foundations of life. But the very pessimism of the modern world is significant of the transformation of a 'struggle for *mere* existence' into a 'struggle for *ideal* existence' (p. 63). The 'ideal good' which succeeds to instinctive or tribal aims must be *'that which is desired unfailingly and for its own sake alone'* (p. 72). Such a good, the author maintains, is to be found neither in material, moral nor intellectual goods, for these are instrumental; nor in happiness, which is variable and sometimes unworthy; nor in religion, for this is either instrumental, or mystical and hardly attainable. There remains only the esthetical good. Beauty is desired and exists for its own sake, absorbs all material and moral values, is disinterested, and is a profound expression of humanity. This supreme worth is both individual and social, in that 'sociability is a feature of individuality'; and is both universal and particular in that it is significant or constituted of meaning, and yet concrete. The present tendency of the individual to trust and utter himself is justified, not because worth is merely individual, but because the enduring ideal is to be found in 'things of the spirit' (p. 105).

The 'office of the imagination' is to enlarge the world, and liberate the spirit from habitual and communal thinking (p. 113). The elements of the imagination are classified as *presentational, ideational* and *emotional.* Sensuous imagery, to be strictly imaginative, must have its own characteristic synthesis, *i. e.,* must compose units expressing the action of the mind; and may be predominantly auditory, visual or verbal. The emotional elements of imagination belong to two distinct types: the esthetic emotion or judgment of beauty, which is intrinsically and finally satisfying; and the primitive feelings and emotions. The former can by no means be reduced to the latter, while the latter retain their specific quality when they respond to an imaginative occasion, and are not transmuted (Winchester) or objectified (Santayana). Thus, in tragedy such emotions as pain, fear, hatred, etc., remain such while at the same time entering into a unity which gives esthetic satisfaction.

The 'creative process' may be analyzed into (1) suggestion or spontaneity, the imagination's offering of concrete materials, and (2) the selective office of the esthetic judgment. The deeper cause of the whole process is 'the internal will—the guiding power of a life's ideals and the molder of its personality' (p. 171). The real motive of art creation is only secondarily commercial or social (Gummere); primarily it is 'instinct for beauty'—self-expression (p. 180). As previously stated, esthetic experience serves no utility, but is the final good—'the final justification of all fact and truth, of all life' (p. 193). It is the supreme instance of intelligibility, *i. e.,* of assimilation to the categories of personality. Personality, so regarded as the highest sanction of values, is human, but not empirical. It is vital, instinctive and growing.

Man's view of nature has passed through four stages of development: animism, personification, determinism and, finally, that rationality which 'sees her as embodying whole personalities, akin to man's, and existing,

as he exists, less for the sake of material realizations than for efficiency and growth' (p. 222). This is the final teaching: "That the whole worth of life is its endeavor to realize what seems to it most beautiful, that beauty is as much in the aspiration as in the ideal image and, finally, that all realization is but in renewed aspiring" (pp. 231–232).

It is difficult and perhaps unfair to criticize the author's philosophy in view of the fact that he avows his purpose to present it both untechnically and dogmatically. But it will be found, I believe, that his more important contentions are conditioned by their philosophical background, and suffer from the vagueness and incompleteness of its presentation. Thus, the author's criticism of the hedonistic esthetics is seriously weakened through his failure to complete his analysis and state the relation of pleasure to 'satisfaction.' Though he insists that disagreeable emotions are not transmuted to pleasure in the esthetic experience, he must on his own showing admit that they compose part of a whole giving esthetic satisfaction, and has not protected himself from the natural inference that satisfaction means *taking pleasure in*. A graver difficulty appears in the author's subordination of moral and intellectual to esthetic values. This is reiterated, but nowhere thoroughly substantiated. Dr. Alexander appears to have identified morality with convention, much as contemporary positivists identify metaphysics with speculative dogmatism, and to have lost sight of the fundamental problem of ethics. If there are any values which moral science is entitled to claim as within its own province, they are those of personality and development, and yet the author annexes these to the field of esthetics without a question.[2] He even suggests that 'certain spiritual activities—moldings of moral and religious character—belong to a sphere finer than that of art,' with no recognition of the general belief that all moldings of character are properly moral (p. 90). The same general objection may be made to the author's depreciation of cognitive values. These are on the whole regarded as strictly instrumental, though with an apparent contradiction.[3] But where is the warrant for this sweeping proposition? The author's subordination of moral to esthetic categories forbids us to look even to pragmatism for relief. No critical reader can be satisfied with the escape which the author makes elsewhere: "That there are logical difficulties besetting this as every other abstract conception, I will not deny; but there are deliverances that more than compensate" (p. 222). I have no doubt that the author is well fortified in his positions, but I think it worth while to point out that the presence of only 'a little philosophy' may seriously imperil the effectiveness of a special study.

Since the author manifests both the love of writing and no little skill therein, I may perhaps be permitted to add that his style impresses me as surprisingly inconsistent. It is both brilliant and stilted, fluent and awkward. How does a writer who can express himself with so much

[2] Cf. pp. 207, 209–210.

[3] Cf. p. 149.

freedom and power[4] find it in him to write, "Helpful here may be illustration" (p. 39)? There is evidence of a straining after rhetorical effect, and of a fondness for unusual, if not original, words. The result is that at critical points, as for example in the introduction of such fundamental ideas as mood and personality, the author fails to make his meaning clear. It seems then too late to be simple and direct. The style which so adequately renders the author's appreciations, mysticisms and rhapsodies is not a proper vehicle for exposition.

The book is most admirable for its sympathetic and sure apprehension of the present age (its individualism, introspection and courageous faith) and for a captivating strain of poetry and eloquence which pervades the whole.

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Che cos'è il bello? MANFREDI PORENA. Milan: Hoepli. 1905. Pp. 483.

In this rather lengthy work the author has given to the Italian public a presentation of esthetic problems and facts which, unfortunately, has not its like in English literature. The author is not interested either in filling out a philosophical system or—at least not very greatly—in elementary psychological experiments: as a result what he has to say seems eminently adapted to the needs of a much larger reading public than the majority of esthetic theories can appeal to. Furthermore, the attention given to specific esthetic elements in painting, sculpture, elocution, architecture, music and literature must make the book interesting reading to almost any one.

The work proper,—omitting an appended criticism of Benedetto Croce's esthetic theory,—falls into two parts, 'Esthetic Elements in General' and 'Elements in the Principal Arts.' The wealth of material in the second part makes it quite impossible to pass comment upon it. Only the first half, then, will be reviewed here.

In the introduction to Part I. (pp. 1–19) the meanings of 'beauty' and 'beautiful' are discussed. "The beautiful is that which has come to be so called; this is our point of departure at least" (p. 4). Beauty is not a predicate of 'lower' sensations; these have feeling tones as accompaniments, but 'in colors and tones we find the beauty in their bare sensation qualities' (p. 9). "We can call a light beautiful even when the sensing of it is painful" (p. 10). From this the author concludes that the esthetic pleasure is not a true sensation quality, but a 'spiritual' one. Beauty is finally defined much as the majority of estheticians define it, namely, as 'that which pleases the soul as an objective quality' (p. 16).

In the second section, treating of 'il bello sensibile,' Porena denies the possibility of classifying colors and tones with reference to their esthetic value; we can at best classify their beauty as immediate or mediate, but this is a genetic rather than a qualitative classification. The author follows this genetic distinction. Immediate beauty can be explained only as that which is a direct result of our organism; into the

[4] Cf. pp. 78–79, 231–233.

details of explaining what peculiarities of this organism are of importance the author does not go, and might be censured for this failure by many investigators who are on the search for genuine contributions to psychology. It is to mediate or relative beauty that by far the greater attention is given; typical and teleological beauty are the two kinds of mediate beauty most easily distinguished. The former is called 'habitual' beauty and, as such, may be found even in an object which, when judged in its immediate aspect, is ugly (p. 57). The author goes so far as to say that typical and immediate beauties are antagonistic (p. 63), but this is an overstatement of the facts which is partially retracted later on. Final beauty is pronounced the most objective kind (p. 69), by which is meant that the end served by the object is the *raison d'être* of the object. It is, however, doubtful whether this fact can fairly be used to interpret the beauty as 'objective' in any ordinary sense of this term. Indeed, the author uses the term 'objective' in the sense of 'social,' inasmuch as he admits that the opinion of the majority of men is decisive in matters of teleological beauty (p. 70).

After touching briefly on the beauty of execution and that of imitation, the writer attacks the problem of expression. Here most strenuous opposition is made to the Einfühlung theory, although it is not beyond suspicion that the writer has misconstrued this hypothesis in some points. "It is not the inner commotion aroused by seeing a mountain . . . but the meaning of the object that is beautiful" (78 ff.). This the adherents of the criticized theory could well admit and still insist that the origin and structure of the *meaning* of the mountain must be explained in their way. Porena urges as fundamental the distinction between inner and outer association, claiming that inner association (connection between image and feeling tones or factors induced by the latter) is only secondary, a mere aid to outer association (89). Lipps's views are here flatly contradicted; their surest disproof Porena finds in the emotional reactions to instantaneous photographs of running men, wherein most of the poses induce wholly different meanings (hence feelings) in the spectator because the normal outer association (the long series of rapidly shifting poses) is lacking (93). One must seriously doubt whether this will prove a stumbling-block to the German school. The greater part of the section on expression is devoted to a concrete study of types of expression in man, animals, inanimate objects and geometrical forms; facts, deeds and situations are likewise investigated as classes. Here, as in the latter half of the book, the author discloses a tremendous wealth of finely observed facts.

The last section of Book I. deals with 'inner beauty.' By this the author means that beauty which is represented, but not that beauty which is essentially in the representative character of the object. Inner beauty is the complement of purely sensuous beauty and is subdivided by the writer in about the same manner; immediate inner beauty is that which appears by virtue of (*a*) the intensity or force of the represented object or else (*b*) the quality represented (135). These subtypes are called

'dynamic' and 'sympathetic' beauties. The mediate inner beauty, on the other hand, depends upon secondary characteristics of the object, chiefly upon type, purpose and imitativeness.

At this point the general theoretical part ends, and the special arts are studied. From the standpoint of pure psychology the abandonment of esthetic types in favor of expression types may seem heretical; we find the treatment of the tragic, the comic, the sublime and so on subordinated to study of (I.) 'ideomimetic' arts, (II.) 'free' arts and (III.) speech and thought. The mass of information and the amount of criticism displayed are quite remarkable and make reviewing impossible.

The general impression made by the whole work is that it is neither eccentric nor revolutionary, but rather a sane and capable presentation of esthetic problems, worthy of perusal by specialist and student alike.

COLUMBIA UNIVERSITY. WALTER B. PITKIN.

La Psychophysiologie du langage musical. JOSÉ INGEGNIEROS. *Revue de Philosophie,* April, 1906. Pp. 386–408.

By musical language Dr. Ingegnieros means employment of the tones of the musical scale and of their conventional symbols in singing or in playing on musical instruments, and the imagery used in thinking of these various activities either in recall or in composition. His object in this article is to describe its origin, growth, physiological and psychological mechanism, and modifications in individuals. This he accomplishes chiefly through comparison with the more closely and extensively studied phenomena of ordinary speech or, as he terms it, articulate verbal language. He points out, to begin with, that both verbal and musical language, especially after they have assumed graphic form, involve complex and constant coordinations, a definite system of symbols.

His statement of the vexed question of the origin of language, whether verbal or musical, is brief. The view is upheld that both originate in reflex sounds, and are not separated in the earlier stages, all language having musical inflections or cadences. Later comes simple melodic elocution, as in the lyric *recitatif* of the Greeks. Gradually words and music become separated; melody without words emerges; the simple rhythmic accompaniments which make up the instrumental music of primitive peoples are replaced by melodic instruments; and we have two parallel series—speech for the expression and communication of ideas, and music, vocal and instrumental, for the expression and communication of sentiments and emotions. The resemblance of this theory to Spencer's is obvious, though music is made coordinate with speech and not merely derivative from it. With the progressive evolution of both speech and music appears a new stage in each, that of written symbols, developing from a rudimentary to a well-organized system.

These two stages, of spoken and of written language, are manifested in each individual. There is first a natural or spontaneous education in spoken language and in singing and, perhaps, in playing some instrument by ear; second, a technical education in the reading and writing of verbal

and musical symbols and, in the case of music, a further technical training in playing upon one or more musical instruments.

In spontaneous musical language without technical training, only two kinds of musical images can be employed, auditory and phonic, or motor images of articulation in singing. A person of the auditory type in recalling or composing music hears mentally; a person of the phonic or articulatory type sings mentally. With technical musical training other types of imagery enter in, although the auditory and the phonic types probably remain dominant. A person may have visual images of the score, may read music mentally; he may have motor images of execution upon some particular instrument; he may have graphic-motor images, of writing the appropriate notes, although this is rare save in the case of a few composers or of copyists of music; he may avail himself more or less indifferently of all types, though the evidence goes to show that the conspicuously musical have one predominant type. The musical imagery employed, of whatever type, depends, like all imagery, partly on native equipment, partly on education. Visual imagery of musical notation and motor imagery of instrumental performance and of writing music are, of course, in these specific forms, due to education, although developed upon a basis of natural predisposition.

Dr. Ingegnieros maintains that those naturally of the auditory type may be persistent practise in singing or playing change to the auditory-motor, or even to the pure motor type, either phonic or instrumental. In the case of musical visualists, those singing or playing from mental score, visual images may with practise be supplanted by motor. Such persons make little use of auditory imagery; they have not 'good ears'; yet by means of motor images they are able to sing or to play correctly without dependence on the written score. He would hardly assert, however, we presume, that such musical visualists possess the musical ability of persons of the auditory type. This evidence, if borne out, tends to show that in learning a complex act the drift in imagery is not necessarily from 'resident' to 'remote,' as is sometimes held. It supports the view of Angell and Moore[1] that attention fastens upon the more complex and less easily controlled phase of the coordination. In general it shows that the sensory nature of the cue-image is relatively indifferent, so long as it serves its function.

Dr. Ingegnieros gives the order of frequency in musical imagery as follows: For those without musical training, (1) auditory, (2) phonic or articulatory, (3) complete or indifferent; for those with musical training, (1) auditory, (2) phonic, (3) instrumental-motor, (4) visual, (5) graphic, (6) complete or indifferent. As is readily seen, the types of imagery used in musical language correspond closely to those used in ordinary language. In ordinary speech, however, there is nothing corresponding to the motor images of instrumental execution, except in the cases of typewriting, compositing, etc. Dr. Ingegnieros mentions such cases as parallel, but makes much of this additional complex coordina-

[1] *Psychological Review*, Vol. III.

tion involved in musical language, saying that it 'has never been mentioned nor described until now.' However this may be, the process of learning to play on a musical instrument does not differ essentially from learning to perform any complex skilful act; and such a process has of late been subjected to experimental control and abundantly described by Swift, Bair, Leuba and others.

With regard to the cerebral conditions governing musical language the writer agrees with the accepted authorities in asserting that the musical centers are subcenters of the corresponding areas for verbal language. He bases his statement that they are functionally specialized as well as intimately connected with the general language centers on the well-known fact that aphasia is sometimes accompanied and sometimes unaccompanied by amusia. But he does not canvass the available data nor add any new pathological evidence. He also raises the question as to how far bimanual instrumental execution and musical language in general are controlled by the left hemisphere of the brain, and holds it still unproved that such specialization is rigid either for verbal or for musical language. He seems unfamiliar with Baldwin's chapters on the 'Origin of Right-Handedness' and on 'Internal Speech and Song in Mental Development'; and in general makes no reference to the large literature on the function and disorders of speech and to the lesser, but respectable, literature on musical imagery.

The article gives a clear description of the recognized facts of musical language, but it presents no new experimental or pathological data, and suggests that there is still room for thorough investigation of the subject. It assumes that the facts of localization and imagery are simpler and more definitely established than the recognized authorities hold them to be, and hardly does justice to their functional aspects, either physiological or psychological.

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La beauté rationelle. G. BERTIER. *Revue de Philosophie,* April, 1906. Pp. 409–414.

This article is a brief statement of the cardinal principles of Souriau's 'La beauté rationelle,' published in 1904; and any appraisal of it must either take the attenuated form of reviewing a review or go back to the original treatise. Souriau's main contention is that beauty is not 'merely subjective,' a matter of individual sensation, taste and sentiment, but is due to the control and organization of these elements by the 'laws of reason,' by judgments of universal validity. This organization reveals itself to consciousness as evident—immediately manifest—perfection. And the essence of perfection resides in the adequate realization of the appropriate end. All ends, however, are not of equal esthetic importance. That has greatest esthetic value which contributes most fully to the conscious life of man.

The phraseology employed is so foreign to that of current esthetic theory as to give a somewhat quaint and formal tone to both book and article.

It carries us back to Kant and even to Aristotle. But we have swung so far from an intellectualistic treatment of esthetics that it is no doubt salutary to recognize the highly organized character of the esthetic experience and the part played by judgment in its upbuilding and consolidation. Souriau's distinction between the subjective and the objective is open to criticism, and his use of such terms as 'reason' and 'sentiment' suggests an outworn psychology, although he insists that they refer not to bare 'faculties,' but to modes of concrete mental operation. Bertier quotes the schoolmen in support of the view of beauty as perfection, inverts Kant's valuation of free and dependent beauty and criticizes his treatment of the sublime. Whoever wishes to acquaint himself with Souriau's position will do well, however, to get at it at first-hand rather than through Bertier's article.

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JOURNALS AND NEW BOOKS

THE AMERICAN JOURNAL OF PSYCHOLOGY. April, 1906, Vol. XVII., No. 2. *Crying* (pp. 149–205): ALVIN BORGQUIST. – "Crying occurs under many different mental and physical conditions, but its essential element, psychologically, proves to be a feeling of helplessness in the infant shading into a feeling of hopelessness and surrender of effort in the typical adult cry." *Wundt's Doctrine of Psychical Analysis and the Psychical Elements, and Some Recent Criticism* (pp. 206–226): EDMUND H. HOLLANDS. – When the whole development of Wundt's doctrine of feeling is examined, none of this criticism (by Dr. Washburn) is valid. But it is useful in pointing out inadequacies in the immediate statement of the doctrine, and may perhaps lead to an attempt at a final definition by the author himself. *Peripheral and Central Factors in Memory Images of Visual Form and Color* (pp. 227–247): ELSIE MURRAY. – The persistence, distinctness and general accuracy of reproduction are conditioned by the relation of the stimulus or image to central conditions, and certain special motor phenomena accompanying fixation. *Further Study of the English Sparrow and Other Birds* (pp. 248–271): JAMES P. PORTER. – The experiments show some differences between them in the ability to learn, in memory, and in the perception and discrimination of form and color. More marked are the differences in emotional and volitional states. *Hypnagogic Images and Bi-vision in Early Childhood* (pp. 272–273): ALEXANDER F. and ISABEL C. CHAMBERLAIN. – Some of the psychological and physiological phenomena now on record only for a much older period of life occur also in childhood and are perceived by children, and may possibly exert some influence upon the development of the individual. *The Electrical Supply in the New Psychological Laboratory at the Leland Stanford, Jr., University* (pp. 274–279): LILLIEN J. MARTIN. *Psychological Literature. Book Notes.*

Deussen, Paul. *The Philosophy of the Upanishads.* Translated by A. S. Gelden. Imported by Charles Scribner's Sons. $3.50.

Joseph, H. W. B. *An Introduction to Logic.* Oxford: The University Press. 1906. 9s. 6d.

Laurie, S. S. *Synthetica, Meditations Epistemological and Ontological.* The Edinburgh University Gifford Lectures for 1905–6. Vols. I. and II. London: Longmans and Co. 1906. 8vo. 21s.

Lotsy, J. P. *Vorlesungen über Dezzendenztheorien mit besonderer Berücksichtigung der Botanischen Seite der Frage gehalten an der Reichsuniversität zu Leiden.* Erster Teil. Jena: Gustav Fischer. 1906. Pp. xii + 384. 8 M.

Major, David R. *First Steps in Mental Growth.* New York: The Macmillan Co. 1906. Pp. xiv + 360. $1.25.

Ross, G. R. T. *Aristotle's de Sensu and de Memoria.* Text and translation with introduction and commentary. Cambridge: The University Press. 1906. 8vo. 9s.

NOTES AND NEWS

Nature (June 28) notes as follows the contents of a paper by Mr. M. H. Godby on the place of natural science in education, which appeared in the May issue of the *Transactions of the Oxford University Junior Scientific Club:* "The spirit of the paper provides an encouraging sign of appreciation of the value of scientific studies, and serves to show that a generous recognition of the importance of a training in the methods of science is producing a beneficial effect upon the present generation of Oxford students. Mr. Godby first indicates the influence on British education exerted by Bacon in directing the attention of speculative thinkers to the importance of founding theories on knowledge gained from the senses, and subsequently refers approvingly to Herbert Spencer's insistence upon the necessity of training the body and the value of a scientific education. As indicative of modern tendencies at Oxford one or two of the writer's remarks may be cited: 'The man of science perhaps alone of all men understands and appreciates the value of working hypotheses, even when they are wrong.' 'A great charm, too, of science is that one can always appeal against the decisions of tutors and authorities to Nature herself, and so there is produced a freedom from the awe of authority which must tend to develop self-respect and to encourage independence and originality.' 'Science is more capable of arousing the interest of its students than other subjects. There is a sort of spirit of antagonism, a feeling that you are pitting yourself against Nature and trying to unravel her secrets, and this feeling is just what will always appeal to the sporting instincts of English boys.' It is satisfactory to find that young Oxford is alive to the responsibility of the university for the growth of scientific knowledge."

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The Final Edition of Spencer's 'First Principles: Part I.' FRANK C. BECKER.

Discussion: Final Statements in the Discussion between Professor Miner and Dr. Baird.

Reviews and Abstracts of Literature. Journals and New Books. Notes and News.

Volume III. No. 12. June 7, 1906.

The Ground of the Validity of Knowledge. Part III. EDWARD G. SPAULDING.

Societies: The Sixth Annual Meeting of the Western Philosophical Association. ARTHUR O. LOVEJOY.

Reviews and Abstracts of Literature. Journals and New Books. Notes and News.

Volume III. No. 13. June 21, 1906.

G. Papini and the Pragmatist Movement in Italy. WILLIAM JAMES.

The Detection of Color-Blindness. VIVIAN A. C. HENMON.

Discussion: Why Solipsism is Rejected. WALTER B. PITKIN.
A Reply to Mr. Marshall. JAMES R. ANGELL.

Societies: Section of Anthropology and Psychology of the New York Academy of Sciences. R. S. WOODWORTH.

Reviews and Abstracts of Literature. Journals and New Books. Notes and News.

Volume III. No. 14. July 5, 1906.

Metaphysics as a Branch of Art. KATE GORDON.

The Ground of the Validity of Knowledge: Conclusion. EDWARD G. SPAULDING.

Societies: The Yale Meeting of Experimental Psychologists. J. W. BAIRD.

Reviews and Abstracts of Literature. Journals and New Books. Notes and News.

Volume III. No. 15. July 19, 1906.

Realism and Pragmatism. B. H. BODE.

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